German towns on the average. (2) The English workingman's favorite budget costs 18 per cent. more in Germany, while (3) the German's favorite budget costs 8 per cent. less in England. With reference to nutritive value, the report states that there is little choice between the German and the English dietary. On the other hand, weekly wage-rates in three selected trades (building, engineering, and printing) average 17 per cent. less in Germany, and weekly hours of labor average 11 per cent. more. Thus the Board of Trade arrives at the comfortable conclusion that "the German rate of money wages per hour is about three-quarters of the English rate, and the cost of rent, food, and fuel nearly one-fifth greater than in England" (p. liii). But they remind the reader that this conclusion is based upon data for wages and hours limited to three trades, and upon the cost of three-quarters of the standard *English* budget. Whether there actually prevails a corresponding difference in the material well-being of workingmen's families in the two countries is a further question.

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INACCURACIES IN ROGERS' HISTORY OF PRICES.

The authority of Professor J. E. Thorold Rogers' History of Agriculture and Prices has been somewhat impaired by serious criticisms directed from various sides against some of the author's conclusions, but hitherto the price averages, so laboriously compiled, upon which that work rests, have been generally accepted without much examination.[1] An effort will be made to criticise these averages in the light of the raw statistical material printed in full in

[1] Professor E. F. Gay, at whose suggestion I have made this study, has incidentally criticised the methods employed by Rogers in making his averages. See Transactions of the Royal Historical Society, New Series, vol. xiv, pp. 260, 261. The critical principles there adopted in examining one of Rogers' tables, that of wool prices, I have followed in a more extensive analysis of other tables of averages.

Rogers' volumes, and to suggest some needful cautions in their use.

The period 1451 to 1600 has been selected for study because it covers the most important phases of the price revolution, and affords an opportunity of testing the adequacy of the statistical material in a time of considerable fluctuation of prices. Within this period I have examined (1) grain prices, including prices of wheat, barley, oats, peas, beans, malt, hay, and straw; (2) wool prices; and (3) wages, including wages of masons, carpenters, sawyers, tillers, and unskilled labor.

(1) The first criticism, obvious after some test of a number of Professor Rogers' calculations, is that the yearly averages are often incorrect. The errors are naturally most frequent when the number of entries is large, and consequently errors of computation are not found to any considerable extent in the wool and labor prices. A few illustrations will suffice to point out the character of the computations for other commodities. The malt averages of the decade 1591–1600 are all incorrect; seventeen of the wheat averages for the period 1451–1500 are inaccurate; and the errors in the wheat averages for the whole period are so numerous as to necessitate the correction of ten of the fifteen decennial averages. The averages of barley and oats prices are also unreliable. These errors of computation are not exceptional. The work abounds with them.[1] These incorrect averages are sometimes used as

[1]A few of Rogers' wheat averages are given here, with the corrected averages:—

Year.	Number of Entries.	Rogers' Average.		Corrected Average.	
		s.	*d.*	*s.*	*d.*
1477	23	6	8	5	11
1484	18	5	3¾	4	3½
1491	32	6	7¼	5	5
1527	44	12	11	14	4¼
1544	26	9	0¼	10	8¾
1545	25	15	6¾	14	1¼
1581	19	14	5¼	15	6
1583	14	20	0	18	2¼
1586	13	45	8¾	36	9¼
1589	8	26	11½	29	2
1597	20	52	4½	49	11

the basis for conclusions which would not have been drawn from the correct figures. In the discussion, for instance, of the wheat prices for 1511, Rogers gives the general average as 5*s*. 8¼*d*. The Cambridge average is 6*s*. 4*d*., and he notes that wheat was much dearer at Cambridge than the country over. But the correct general average for all localities is 6*s*. 2*d*., while a single entry from Finchale (Durham) stands at 6*s*. 8*d*.

Inconsistency in the handling of material is the second ground for criticism. The familiarity which was gained from an intimate knowledge of the sources may have permitted, at times, a free use of the price entries. But such free use should have been in each case justified by full explanation, and this ordinarily is lacking.

One source of difficulty, to illustrate this point, is in the use of the Wearmouth celdra, or chaldron, a measure for grain of all kinds. For the averages of 1456 and 1457 entries of barley from Wearmouth, quoted in celdra, are included; but for 1471 and 1479, without explanation, similar entries from the same place are excluded. In 1483 and 1484 the celdra of barley from Wearmouth appears to be included again. For 1467 the Wearmouth celdra of wheat is rejected, without explanation, tho the usual practise is to include such wheat entries.

The reduction of the quotations expressed in celdra to the price per quarter is also uncertain. The celdra is said to contain thirty-four bushels, while the quarter in which all grain prices are given contains eight bushels.[1] This basis does not appear to have been used, however, in some of the reductions. For the year 1519 the price of wheat is calculated on a celdra of four quarters. For the same year the price of barley is computed on a basis of about four and two-thirds quarters to the celdra, which is also the basis for the reduction of an entry of rye in 1525.

Further confusion arises from the arbitrary use of a small number of entries of wheat meal and flour, which are frequently, tho not invariably, included, while a

[1] Agriculture and Prices, iii. 3.

large number of such entries occurring in the same year is often excluded. For example, two entries of meal are used for 1451, four entries for 1457, one for 1459, and three for 1466 are not used. Single entries are included in 1481 and 1484, but six entries are rejected in 1487, while one is used in 1483 and two are rejected in 1500. Entries of wheat flour are used in the averages for 1452, 1467, and 1481; but they seem to be rejected in the averages for 1503, 1511, and on other occasions.[1] A similar irregularity is found in the use of certain items from the Wardrobe accounts. Entries marked "Remanets" are excluded from the average in 1456, included again in 1494 and 1500, and again excluded in 1504. For the average of 1561 six entries of chete, a kind of coarse wheat meal, appear to be included, altho this is contrary to the usual practise with chete entries.

There is usually no justification attempted for this arbitrary use of material. But sometimes we find, by way of explanation, the statement that the entry states a price too much above or below the probable price level of the year to allow of its inclusion in the average. That is to say, Professor Rogers has performed his work with certain definite notions in mind as to the probable range of prices, and has used his material in accordance with this subjective criterion. For example, he computes the average price of peas for 1461 from one entry at 2*s.* 8*d.*, and another at 6*s.*, the latter being a mixture of peas and vetches. For 1463 he quotes a single entry at 2*s.* 8*d.*, while rejecting two entries which average 6*s.*, on the ground that the latter are "suspiciously high." Yet their average is not higher than the single entry of 6*s.* used in 1461. Again, an entry of peas at 8*s.* from Jarrow for the year 1477 is considered "too great to furnish the basis for an average." Yet four years later three entries from the north are used which average 8*s.* 4*d.* The use of the latter figures is justified on the ground of defective harvests—a convenient explanation

[1] The method of ascertaining inclusion or exclusion is by comparison of the averages, and especially by comparison of the statement of entries and localities.

and a favorite one with Rogers, but overworked by him. Defective harvests doubtless contributed to the periodic fluctuations of prices. But it is curious to find the statement that "the gradual rise in the last three decades [of the fifteenth century] is quite as much due to be ascribed to defective harvests as to increased demand or to generally stiffening prices," [1] when during this period Rogers is frequently rejecting price records of peas, oats, and rye because, as a result of defective harvests, they are abnormally high.[2]

(2) The material for the wool prices is both scanty and irregular, and frequent instances of manipulation occur. In the forty-two years from 1541 to 1582, inclusive, only nine entries of wool prices are found, but these are made to serve as the basis of decennial averages. Such averages cannot be other than misleading. In the decade 1541–50, for example, only three entries occur. One is from Oxford in 1547 at 9*s.* 4*d.* the tod. The other two are for the year 1545. One is from Lincoln "at a little over 15*s.* the tod," and the other is from Wilton, described as follows: "15 pond, called 15 weight, at 16*s.*" This description of the pond is puzzling, and he says of the entry, "At the familar Wiltshire weight this entry reduces to 21*s.* 4*d.* the tod; if it be a 15-pound stone, it gives 32*s.* 7*d.*, a very improbable price." Yet, in computing the decade averages he uses this improbable price of 32*s.*, having dropped the 7*d.* The Lincoln entry is discarded altogether.

The pond, or pondus, was a local Wiltshire weight, used in that section as a unit of 21 pounds, and elsewhere equivalent to the tod. In some cases the size of this unit is noted, in others it is not. In 1463 at Bromham (Wiltshire) it is given as 21 pounds. In an entry from Oxford in 1495 it is given as equivalent to the tod. But in 1477

[1] Agriculture and Prices, iv. 270.

[2] But even this theory is not followed consistently. For the year 1525 Rogers quotes an entry of mixed beans and peas from Finchale at 2*s.* 10*d.* as the average price of peas, while rejecting an entry of peas from Sion at 6*s.* 8*d.* The next year the Sion entry of peas at 7*s.* 8*d.* is the only one found, and this is taken as the general average for the year.

it occurs in an entry from Cheddar (Somersetshire), and no explanation is offered of its size.

(3) The material on which the wage averages are based is so scanty that the same opportunity for manipulation does not occur. Occasional irregularities are to be found, however, as with regard to the kinds of labor to be included under "common" or "unskilled" labor. Sometimes hedging, ditching, gardening, and the like are included, and at other times such occupations are rejected. In general, however, the wage averages are far more consistently compiled and more accurately computed than the averages of grain and wool prices.

These illustrations of Rogers' method are, perhaps, sufficient to indicate that his averages, with the possible exception of the wage averages, must always be tested before their claim to trustworthiness is established.

I pass now to a further line of criticism, bearing upon the local distribution of the entries and the actual variations in prices. In order to study this distribution, I have grouped the entries roughly in three sections, according as they come from the North, the West, or the South and East. The North includes all entries north of a line passing through Rutland, Leicester, and Stafford. The West is separated from the South and East by a line drawn south from Rutland through Northampton, Bedford, and Middlesex, to Brighton on the South. This arrangement permits of a rough classification of the entries in such a way that the possibility, at least, of similar conditions is greater than for the whole of England. As will be shown later, however, the variations in price between localities of the same section are often considerable.[1]

The following table shows the distribution of entries of grain prices. Entries of wool prices are not given because of their scarcity, and wages are omitted because in the latter half of the period they consist almost exclusively of entries from Cambridge and Oxford.

[1] In some cases Rogers has used quotations from places the exact location of which he did not know. Such entries have not been used in the analysis by localities, tho in testing the annual averages account has been taken of them.

TABLE SHOWING THE NUMBER AND DISTRIBUTION OF PRICE ENTRIES.

Years.	Wheat.					Oats.					Barley.					Malt.				
	Rogers' Figures.	South and East.	West.	North.	Total.	Rogers' Figures.	South and East.	West.	North.	Total.	Rogers' Figures.	South and East.	West.	North.	Total.	Rogers' Figures.	South and East.	West.	North.	Total.
1451–60 . . .	500	303	55	129	487	249	78	81	81	240	235	105	19	110	234	278	161	9	109	279
1461–80 . . .	568	459	55	43	557	172	58	54	55	167	151	61	15	70	146	403	319	15	47	381
1481–1500 . .	553	408	84	34	526	136	92	28	10	130	104	47	21	25	93	449	363	63	17	443
1501–20 . . .	711	681	20	7	708	122	110	5	5	120	106	68	27	8	103	281	250	28	4	282
1521–40 . . .	799	715	2	75	792	147	123	8	6	137	88	51	2	17	70	422	372	15	41	428
1541–60 . . .	587	559	28	1	588	58	52	6	—	58	24	12	13	—	25	25	11	13	—	24
1561–80 . . .	690	326	326	2	654	40	31	10	—	41	40	11	29	—	40	99	49	10	—	59
1581–1600 . .	445	174	136	127	437	142	39	37	51	127	80	8	23	44	75	351	133	112	113	358
Totals	4,853	3,625	706	418	4,749	1,066	583	229	208	1,020	828	363	149	274	786	2,308	1,658	265	331	2,254

Years.	Peas.					Beans.					Hay.					Straw.				
	Rogers' Figures.	South and East.	West.	North.	Total.	Rogers' Figures.	South and East.	West.	North.	Total.		South and East.	West.	North.	Total.		South and East.	West.	North.	Total.
1451–60 . . .	47	23	2	22	47	16	—	13	3	16		26	19	1	46		8	15	7	30
1461–80 . . .	36	24	2	13	39	50	17	20	14	51		38	27	4	69		5	2	—	7
1481–1500 . .	46	19	22	7	48	66	45	9	10	64		60	45	1	106		22	17	7	46
1501–20 . . .	62	62	—	4	66	92	89	—	3	92		110	24	6	140		19	12	17	48
1521–40 . . .	18	32	2	12	46	48	39	2	9	50		88	54	5	147		32	15	—	47
1541–60 . . .	21	20	3	—	23	17	—	17	—	17		51	66	—	117		29	50	—	79
1561–80 . . .	140	139	1	—	140	35	5	26	—	31		31	49	—	80		51	55	—	106
1581–1600 . .	204	92	6	91	189	121	17	98	—	115		2	54	—	56		16	72	—	88
Totals	574	411	38	149	598	445	212	185	39	436		406	338	17	761		182	238	31	451

This table shows that far the greater number of entries are from the district designated as South and East. The distribution among the sections throughout the period is also very uneven. In every case more than one twenty-year period occurs in which not one entry yearly is found from West and North, while many twenty-year periods are entirely unrepresented from those sections. In no instance is this irregularity more marked than in the case of wheat and yet no other article quoted by Rogers is so generally used as the price index of the period. The annual averages, therefore, are not representative of general price conditions, but are, for the most part, descriptive only of the South and East, with variations due to the irregular appearance of entries from the other sections.

The effect of these irregular appearances upon the decennial averages of the different sections may be seen from the following table, which presents the decennial averages of wheat prices, by sections:—

TABLE OF DECENNIAL WHEAT AVERAGES.

Years.	Rogers' Averages.			Corrected Averages.		South and East.			West.			North.		
	Entries.	*s.*	*d.*	*s.*	*d.*	Entries.	*s.*	*d.*	Entries.	*s.*	*d.*	Entries.	*s.*	*d.*
1451–60 .	500	5	6½	5	4½	303	5	4	55	5	5¼	129	5	4¾
1461–70 .	316	5	4½	—	—	256	5	6½	36	4	10¾	17	5	7¼
1471–80 .	252	5	4¼	5	1½	203	5	0¼	19	5	2	26	5	8
1481–90 .	259	6	3½	6	1¼	161	5	10	73	6	3¾	21	6	11
1491–1500	294	5	0¾	4	8	247	4	7½	11	5	9½	13	4	3½
1501–10 .	434	5	5½	—	—	411	5	5¼	16	6	2	4	3	11½
1511–20 .	277	6	8¾	6	7	270	6	6¾	4	7	3¾	3	7	1¼
1521–30 .	421	7	6	7	9½	351	7	7½	2	10	7	61	8	6
1531–40 .	378	7	8½	7	9¾	364	7	10	—	—	—	14	7	6½
1541–50 .	259	10	8	10	7	256	10	6¾	2	13	8	—	—	—
1551–60 .	328	15	3¾	—	—	303	15	6¼	26	12	6	1	8	2
1561–70 .	334	12	10¼	—	—	122	13	8½	208	12	1½	—	—	—
1571–80 .	356	17	11½	—	—	204	15	11¼	118	19	8½	2	14	2
1581–90 .	201	23	11¼	22	3¾	86	18	4	60	21	8½	47	29	10
1590–1600	244	34	8	31	3¾	88	30	9½	76	35	7½	80	27	9½

The fluctuation of the number of entries from the West and North, and its effect upon the general average, are well shown in this table. The appearance of 73 entries from the West in the decade 1481–90 has exaggerated the

general rise in price for that decade. The presence of 61 entries from the North in 1521–30 tends to pull up the general average, but thereafter the North has only 17 entries in fifty years, and so does not affect the average. The decline of the average in 1561–70 and its rise in 1571–80 are both exaggerated by the presence of large entries from the West, while the North enters in the last decade but one to dominate the price movement.

Finally, the variations of prices in a single section may be noticed briefly. The wheat prices of the Cambridge, Sion, and Wardrobe accounts went through such fluctuations as the following:—

Year.	Cambridge.		Sion.		Wardrobe.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*
1521	4	4	8	4½	10	1¼
1527	15	2¼	12	0½	21	4¼
1535	13	4½	10	8	6	1¼
1537	4	11	7	0¾	9	4¼

In the face of these and similar variations the unsatisfactory character of the general averages again becomes obvious. The lack of a continuous series of entries from any one locality, the sudden changes of price which occurred in places so near each other, all make the attempt to develop a basis for general conclusions very uncertain.

The evidence presented in this analysis will perhaps suffice to indicate the chief qualifications which must limit the acceptance of the averages of the "History of Agriculture and Prices." The labor averages must be accepted as of local rather than of general significance. The wool prices are so defective and the averages so misleading as to be practically useless. The grain prices are complete enough to be of service, but they must be used with caution.

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